#7 from warm up:

$0.6825 \pm 1.96\sqrt{\quad}$

$n = 2000$

$\hat{p} = \frac{1365}{2000}$

$* \hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

$z^* = 1.96$

$(0.6621, 0.7029)$

95%

*I am 95% conf....

$\hat{p} = \frac{x}{n}$

Notes from yesterday

Ex. 3

$\hat{p} = \frac{3314}{17096}$

$z^* = 1.65$

$n = 17{,}096$

90% conf.

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

(0.18887, 0.19882)

18.9% – 19.9%

90%
1.65

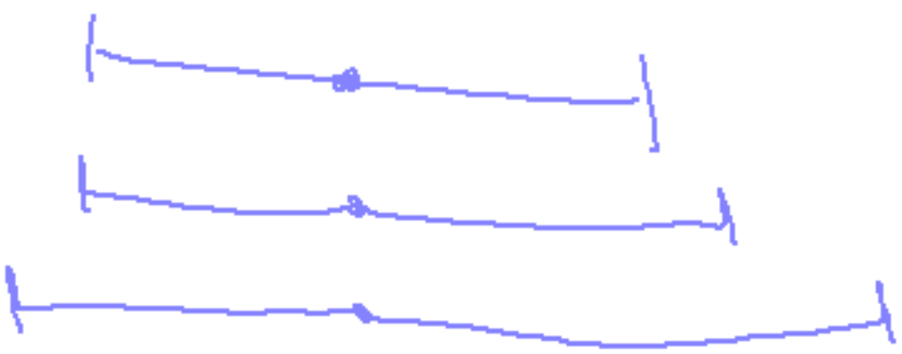
18.8% – 20%

95%
1.96

18.6% – 20.2%

99%
2.58

90%
95%



Ex 5:

$\hat{p} = 0.36$

$n = 50$

$C = 95\%$

22.7% – 49.3% $n=50$

28.3% – 43.7% $n=150$

31.8% – 40.2% $n=500$

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

- as $n \uparrow$, interval/margin of error $\downarrow$
- as conf $\uparrow$, interval/moe $\uparrow$

9.1 notes
(part 2)

Margin of Error:

① small

② $m.o.e. = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

③ n = sample size

z^* = level of confidence

④ Confidence (z^*) ⟶ lower

NO

Sample size ⟶ bigger

YES

Choosing sample size

① to give us a certain m.o.e.

② $m = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ ← solve

③
- m
- z^*
- $\hat{p}$

*PROBLEM: $\hat{p} = \frac{x}{n}$

*ANSWER: use a previous guess for $\hat{p}$

④ - use a conservative value for $\hat{p}$

$\hat{p} = 0.50$

$$m = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Ex: $0.03 = m$

$95\% \rightarrow z^* = 1.96$

$\hat{p} = 0.50$

$$\frac{0.03}{1.96} = \frac{1.96\sqrt{\frac{(0.5)(0.5)}{n}}}{1.96}$$

$$0.01531^2 = \left(\sqrt{\frac{(0.5)(0.5)}{n}}\right)^2$$

$$n \cdot 2.343 \times 10^{-4} = \frac{(0.5)(0.5)}{n} \cdot n$$

$$\frac{n \cdot (2.343 \times 10^{-4})}{2.343 \times 10^{-4}} = \frac{(0.5)(0.5)}{2.343 \times 10^{-4}}$$

(0.5)(0.5)/Ans

$n = 1067.11$

$n \approx 1068$

*ALWAYS ROUND UP

(1) $0.04 = 1.65\sqrt{\frac{(0.6)(0.4)}{n}}$

$n = 409$

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(2) $0.01 = 2.58\sqrt{\frac{(0.5)(0.5)}{n}}$

$n = 16641$

worksheet examples